

(1)

$$\Psi(\mathbf{r}, t)$$

$$\times \hat{U}_{r, \frac{\tau}{2}}$$

(2)

$$\Psi(\mathbf{r}, t + \tau/2)$$

$$\mathcal{F}$$

$$\Psi'(\mathbf{k}, t)$$

$$\times \hat{U}_{p, \tau}$$

(3)

$$\Psi'(\mathbf{r}, t + \tau/2)$$

$$\mathcal{F}^{-1}$$

$$\Psi'(\mathbf{k}, t + \tau)$$

$$\times \hat{U}_{r, \frac{\tau}{2}}$$

$$\Psi(\mathbf{r}, t + \tau)$$